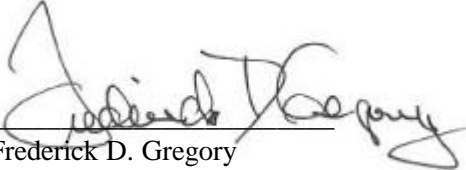


## ***BASELINE VERSION***



# **Coordinate Nuclear Launch Safety Approval (NLSA) Process**

  
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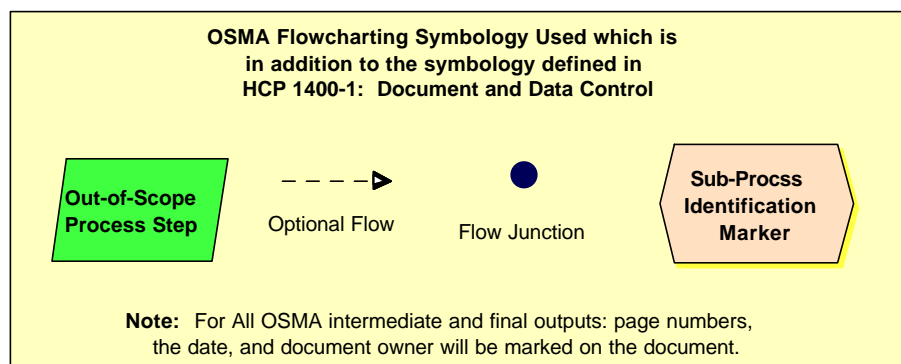
January 13, 2000  
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## 1. Purpose

The purpose of this Office of Safety and Mission Assurance (OSMA) Headquarters Office Work Instruction (HOWI) is to document the process for the review of the risks associated with the launching of radioactive materials into space. The result is the granting of Nuclear Launch Safety Approval (NLSA) which is required by Presidential Directive / National Security Council Memorandum #25 (PD/NSC-25) paragraph 9. This OSMA HOWI provides the flowchart, and steps for the process as well as establishing the quality records associated with the task as OSMA's means to implement Chapter 5 of NPG 8715.2.

## 2. Scope and Applicability

This OSMA HOWI is applicable to the Nuclear Flight Safety Assurance Manager (NFSAM) in his role as the responsible party for ensuring that PD/NSC-25 is followed for all NASA launches.

## 3. Definitions

- 3.1. A<sub>2</sub> Value: The A<sub>2</sub> value is a nondimensional value which normalizes the possible radiological health effects due to prolonged exposure to the radioactive material. A value of one A<sub>2</sub> is considered a minimum value where health-physics effects might occur. The A<sub>2</sub> for a mission is determined by summing the A<sub>2</sub> values for each isotope as determined from the International Atomic Energy Agency Safety Series 6 Table 1. This table and the A<sub>2</sub> determination is contained in section 504 of NPG 8715.2: *NASA Basic Safety Manual*.
- 3.2. AA/SMA: Associate Administrator for Safety and Mission Assurance
- 3.3. EOC: Emergency Operations Center
- 3.4. EOP: Executive Office of the President
- 3.5. INSRP: Interagency Nuclear Safety Review Panel. An ad-hoc panel formed per PD/NSC-25.
- 3.6. Nuclear Flight Safety Assurance Manager (NFSAM): OSMA Staff member responsible for the nuclear safety launch approval process
- 3.7. Nuclear Launch Safety Approval (NLSA): Approval to launch radioactive materials into space per PD/NSC-25.
- 3.8. Office of Scientific and Technical Policy (OSTP): Office within the Executive Office of the President which provides Executive oversight of NASA.
- 3.9. PM: Program Manager
- 3.10. RADCC: Radiological Control Center
- 3.11. Radioactive Materials: A material that contains an isotope, which spontaneously gives off either a particle or an electromagnetic emission.

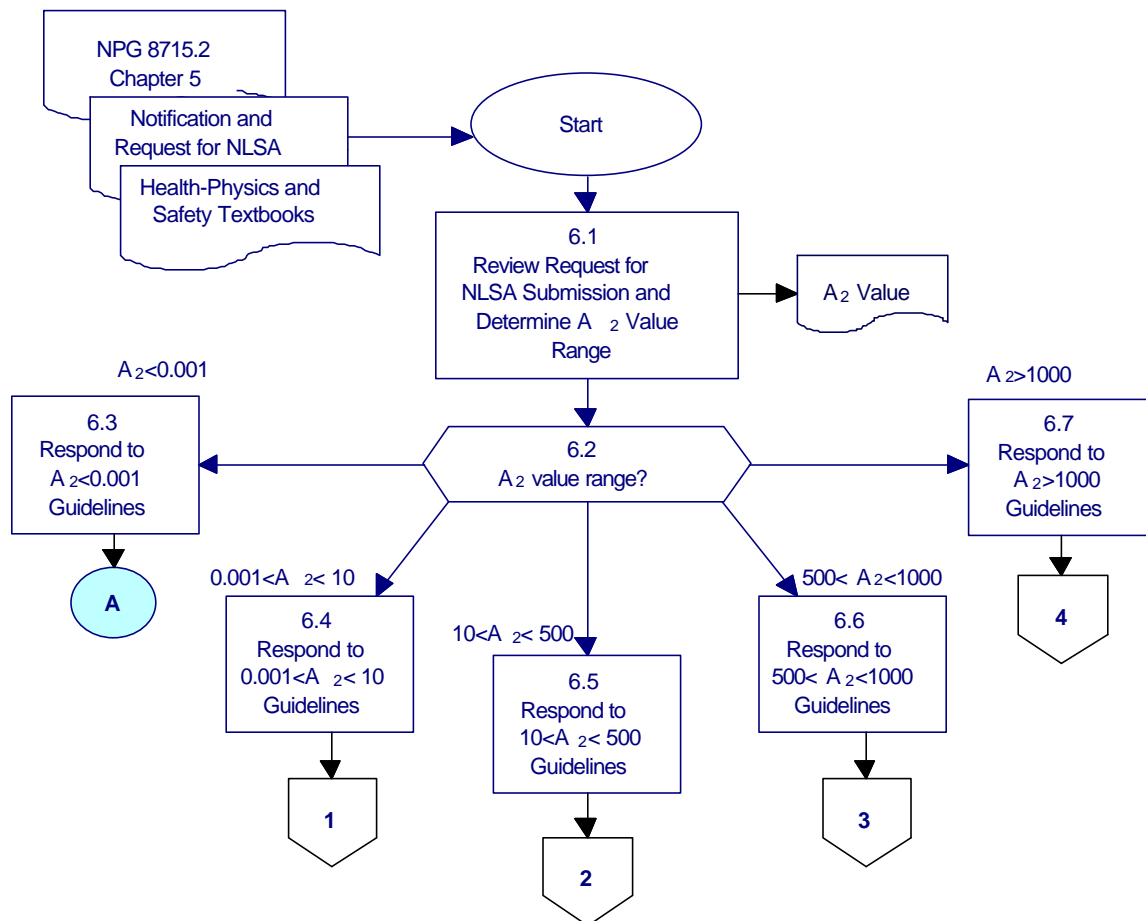
- 3.12. REPP: Radiological Emergency Preparedness Plan
- 3.13. Radioactive Materials Report (RMR): Report per NPG 8715.2 which lists the radioactive materials contained on an upcoming launch. RMR is submitted per section 5.5.2 of NPG 8715.2.
- 3.14. Safety Analysis Report (SAR): Report developed by the applicable NASA Program per NPG 8715.2 paragraph 5.4.8.3 which describes the analyses performed to quantify the additional risk as a result of including radioactive materials on a proposed launch. A SAR is prepared for missions with  $A_2$  values of greater than 1000.
- 3.15. Safety Analysis Summary (SAS): Report developed by the applicable NASA Program per NPG 8715.2 paragraph 5.4.7.3 which describes the analyses performed to quantify the additional risk as a result of including radioactive materials on a proposed launch. A SAS is prepared for missions with  $A_2$  values between 10 and 1000.
- 3.16. Safety Evaluation Report (SER): Report developed by the INSRP per NPG 8715.2 paragraph 5.4.8.4 which describes the INSRP's evaluation of the analyses performed by the Program to quantify the additional risk as a result of including radioactive materials on a proposed launch. A SER is prepared for missions with  $A_2$  values greater than 1000.

#### 4. Reference Documents

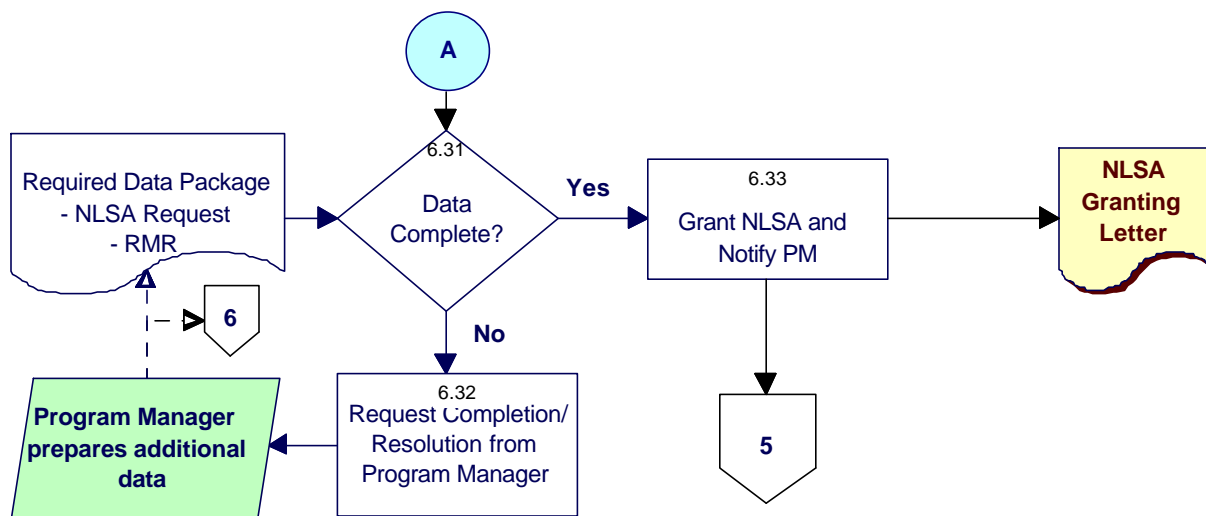
The documents listed in this section are used as reference materials for performing the processes covered by the Quality Management System (QMS). Since all NASA Headquarters Level 1 (QMS Manual) and level 2 (Headquarters Common Processes) documents are applicable to the QMS, they need not be listed in this Section unless specifically referenced in this OSMA HOWI.

- 4.1. [NPG 8715.2: NASA Emergency Preparedness Plan](#)
- 4.2. [NPG 8715.3: NASA Safety Manual, Chapter 5](#)
- 4.3. Presidential Directive / National Security Council Memorandum # 25 (PD/NSC-25) "*Scientific or Technological Experiments with Possible Large-Scale Adverse Environmental Effects and Launch of Nuclear Systems into Space*," dated May 8, 1996.

## 5. Flowchart



### A<sub>2</sub> < 0.001 Guidelines



```
graph TD
    Start([1]) --> D1{6.41 Data Complete?}
    D1 -- Yes --> P1[6.43 Grant NLSA and Notify PM]
    P1 --> O1[NLSA Granting Letter]
    D1 -- No --> P2[6.42 Request Completion/ Resolution from Program Manager]
    P2 --> P3[/6.44 Notify OSTP of Granting NLSA/]
    P3 --> O2[OSTP Notification Letter]
    P3 --> End([5])
    P3 -.-> P4[/Program Manager prepares additional data/]
    P4 -.-> D1
```

The flowchart illustrates the NLSA Request Process. It begins with a start terminal (1) leading to a decision point (6.41) asking "Data Complete?". If the answer is "Yes", the process moves to step 6.43, "Grant NLSA and Notify PM", which results in an "NLSA Granting Letter". If the answer is "No", the process moves to step 6.42, "Request Completion/ Resolution from Program Manager". From here, it proceeds to step 6.44, "Notify OSTP of Granting NLSA", which results in an "OSTP Notification Letter" and leads to an end terminal (5). A feedback loop exists from step 6.44 back to a process box labeled "Program Manager prepares additional data", which then loops back to the "Data Complete?" decision point.

```
graph TD
    Start{{2}} --> D1{Data Complete?}
    D1 -- Yes --> P1[Analyse Nuclear Risk and Discuss with PM]
    P1 --> P2[Present Nuclear Risk to AA/SMA]
    P2 --> D2{Grant NLSA?}
    D2 -- No --> P3[Request Completion/Resolution from Program Manager]
    P3 --> P4[Program Manager prepare additional data]
    P4 --> D1
    D2 -- Yes --> P5[Notify PM]
    P5 --> P6[Notify OSTP of Granting NLSA]
    P6 --> End{{5}}
```

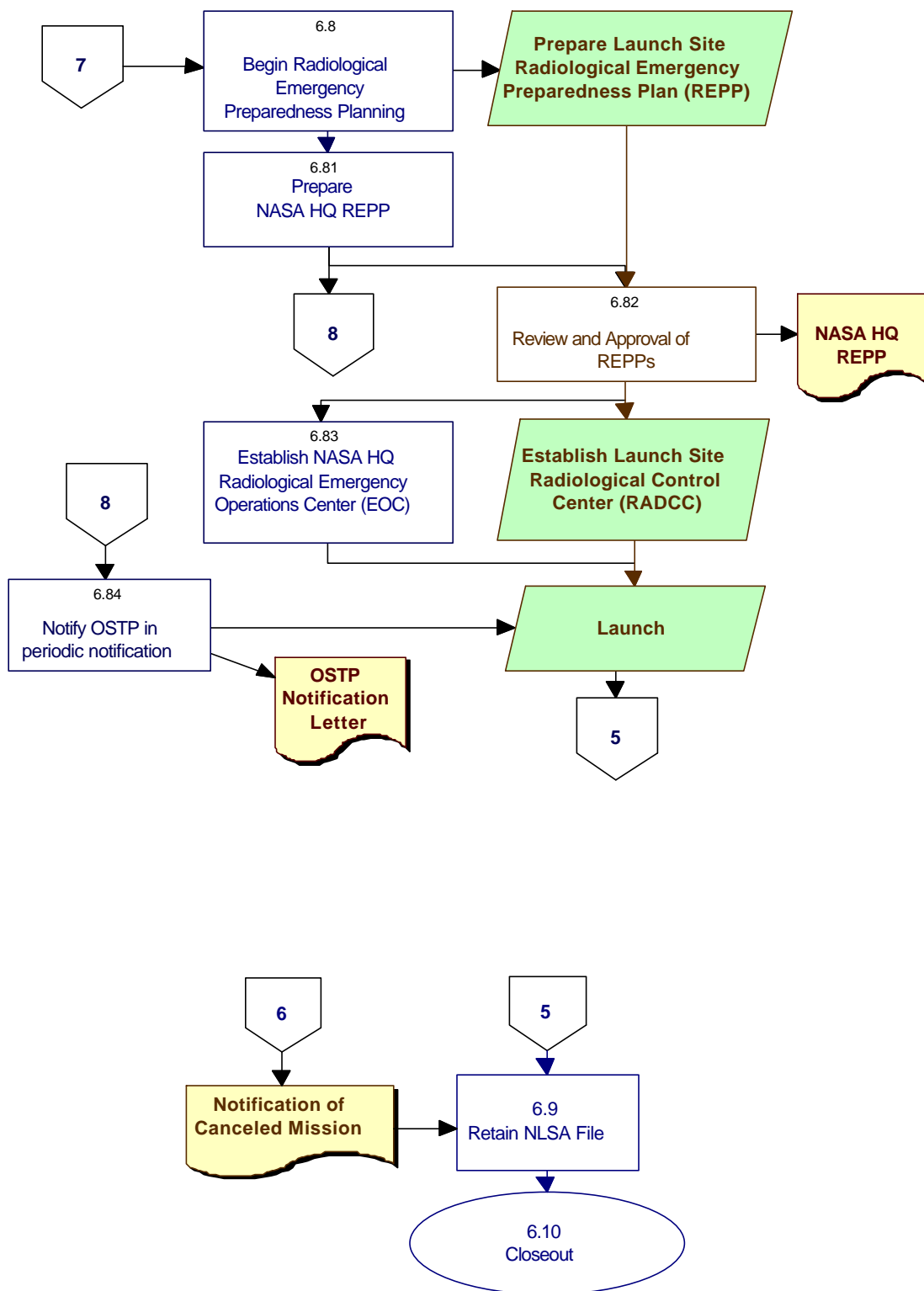
The flowchart illustrates the process for granting a Nuclear Security Letter (NSL). It begins with a start node (2) leading to a decision point (6.51) "Data Complete?". If the data is complete (Yes), the process moves to "Analyse Nuclear Risk and Discuss with PM" (6.53), then to "Present Nuclear Risk to AA/SMA" (6.54), and then to a decision point (6.55) "Grant NLSA?". If the NLSA is granted (Yes), the process moves to "Notify PM" (6.56), then to "Notify OSTP of Granting NLSA" (6.57), and finally to the end node (5). If the NLSA is not granted (No), the process moves to "Request Completion/Resolution from Program Manager" (6.52), then to "Program Manager prepare additional data", which loops back to the "Data Complete?" decision point. The "Required Data Package" includes: NLSA Request, RMR, Mission Description, and Scoping Materials. The process also includes "Analysis & Briefing", "NLSA Granting Letter", and "OSTP Notification Letter".

## Guidelines

```
graph TD
    Start([3]) --> D1{6.61 Data Complete?}
    D1 -- Yes --> P1[6.63 Analyze Nuclear Risk and Discuss with PM]
    P1 --> P2[6.64 Present Nuclear Risk to AA/SMA]
    P2 --> P3[6.65 Present Nuclear Risk to NASA Administrator]
    P3 --> D2{Grant NLSA?}
    D2 -- No --> P4[6.66 Notify PM of Negative NLSA]
    P4 --> P5[Request Completion/Resolution from Program Manager]
    P5 --> D1
    P5 --> P6[Program Manager provides additional data]
    P6 --> D1
    D2 -- Yes --> P7[6.67 Notify PM of Granting NLSA]
    P7 --> P8[6.68 Notify OSTP of Granting NLSA]
    P8 --> End([5])
    P8 --> P9[OSTP Notification Letter]
    P9 --> P10[SAS, SAS Analysis & Briefing]
    P10 --> P11[NLSA Granting Letter]
    P11 --> P4
```

The flowchart illustrates the process for handling an NLSA Request. It begins with a start node (3) leading to a decision point (6.61) "Data Complete?". If the data is complete (Yes), the process moves to "Analyze Nuclear Risk and Discuss with PM" (6.63), then "Present Nuclear Risk to AA/SMA" (6.64), and "Present Nuclear Risk to NASA Administrator" (6.65). A decision point (6.66) "Grant NLSA?" follows. If the answer is No, the process moves to "Notify PM of Negative NLSA" (6.66), then "Request Completion/Resolution from Program Manager" (6.62), and back to the "Data Complete?" decision. If the answer is Yes, the process moves to "Notify PM of Granting NLSA" (6.67), then "Notify OSTP of Granting NLSA" (6.68). From here, the process branches into "OSTP Notification Letter" and "SAS, SAS Analysis & Briefing". The "SAS, SAS Analysis & Briefing" leads to "NLSA Granting Letter", which then leads to "Notify PM of Negative NLSA" (6.66). A separate path shows "Program Manager provides additional data" (6) leading to the "Data Complete?" decision.

```
graph TD
    4{{4}} --> 6.71[6.71 Prepare INSRP Empanelment Letter with PM]
    6.71 --> 6.72[6.72 NASA Administrator Empanelment ad hoc INSRP]
    6.72 --> 7{{7}}
    6.72 --> INSRP_Letter[INSRP Empanelment Letter]
    Agencies[Agencies provide INSRP Member] --> 6.72
    6.72 --> 6.73{6.73 Data Complete?}
    Data_Pkg[Required Data Package  
- Safety Analysis Report  
- Safety Analysis Summary for smaller sources] --> 6.73
    6.73 -- Yes --> 6.74[6.74 Request Completion/Resolution from Program Manager]
    6.73 -- No --> 6.75[6.75 Present Nuclear Risk to AA/SMA]
    6.74 --> 6.76[6.76 Present Nuclear Risk to NASA Administrator]
    6.75 --> 6.76
    6.76 --> 6.77{6.77 Request NLSA from OSTP?}
    6.77 -- Yes --> 6.78[6.78 Present Nuclear Risk to OSTP]
    6.77 -- No --> 6.79{6.79 Grant NLSA?}
    6.78 --> Mission_Eval[File on Mission INSRP Evaluations]
    6.78 --> 6.79
    6.79 -- Yes --> 9{{9}}
    6.79 -- No --> 6.74
    6.79 --> NLSA_Letter[NLSA Granting Letter]
    6.74 --> 6[6 Program Manager prepares additional data]
    6 -.-> 6.73
```





## 6. Procedure

Note: Per NPG 8715.2 Section 5.3.2.2 & 5.4.1.1.a, the Program Manager (PM) must notify the OSMA NFSAM "as soon as radioactive sources are identified for potential use."

### 6.1 Nuclear Flight Safety Assurance Manager (NFSAM) Review Request for Nuclear Launch Safety Approval (NLSA)

This process is initiated by the NFSAM after Program Office notification or notification from a Center Radiation Safety Officer stating that radiological materials are being planned for launch. The Program Officer or the Center Radiation Safety Officer notifies the NFSAM of the materials intended for launch.

Per NPG 8715.2 Section 5.4.2, the NFSAM determines the  $A_2$  Mission Multiple value.

### 6.2 NFSAM $A_2$ Value Range?

Per NPG 8715.2 Section 5.4, the NLSA procedures and guidelines are based on the  $A_2$  Mission Multiple. The user will jump to Step 6.3/6.4/6.5/6.6/6.7 in this HOWI based on the  $A_2$  Mission Multiple.

### 6.3 NFSAM & PM Respond to $A_2 < 0.001$ Guidelines: NLSA uses NPG 8715.2 Section 5.4.4. (If $A_2 > 0.001$ then go to step 6.5)

#### 6.3.1 NFSAM Data Complete:

*For  $A_2 < 0.001$ , the PM is required by NPG 8715.2 Section 5.4.4 to provide the NFSAM with the Radiological Materials Report (RMR) (NPG 8715.2 Section 5.5.2) and a request for NLSA.*

The NFSAM will ensure that the material is complete and clear. If it is not complete per NPG 8715.2 Section 5.4.4 or it is not clear then more data will be requested. Otherwise NLSA review will commence.

#### 6.3.2 NFSAM Request Completion/Resolution from Program Manager: The NFSAM will contact the PM and request that the required data be resubmitted.

*Note: The PM has the option to cancel the mission.*

#### 6.3.3 NFSAM Grant NLSA and Notify PM:

**Note:** Mitigating circumstances and levels of clarity of materials presented are determined by the NFSAM based on his professional experience required by his position description using available health-physics reference materials.

Per NPG 8715.2 Section 5.4.4, the NFSAM reviews the request for NLSA. When all required data is received and there are no mitigating circumstances, the NFSAM may grant NLSA. The NFSAM prepares a letter notifying the PM that NLSA has been granted. After NLSA is granted, the NLSA granting letter is forwarded to the PM and is added as quality records. And the HOWI user is to proceed to step 6.9 for HOWI closeout.

- 6.4 NFSAM & PM Respond to  $0.001 < A_2 < 10$  Guidelines:  
NLSA uses NPG 8715.2 Section 5.4.5. (If  $A_2 > 10$  then go to step 6.5)

- 6.4.1 NFSAM Data Complete?

*For  $0.001 < A_2 < 10$ , the PM is required by NPG 8715.2 Section 5.4.5 to provide the NFSAM with the Radiological Materials Report (RMR) (NPG 8715.2 Section 5.5.2) and a request for NLSA.*

The NFSAM will ensure that the material is complete and clear. If it is not complete per NPG 8715.2 Section 5.4.5 or it is not clear, then more data will be requested. The NFSAM may request additional data be provided for sources which are not calibration or commonly used sources (e.g.; Orbiter Smoke Detectors are considered as common sources for NLSA). Otherwise NLSA review will commence.

- 6.4.2 NFSAM Request Completion/Resolution from Program Manager:  
The NFSAM will contact the PM and request that the required data be resubmitted.

*Note: The PM has the option to cancel the mission.*

- 6.4.3 NFSAM Grant NLSA and Notify PM:

Per NPG 8715.2 Section 5.4.5, the NFSAM reviews the request for NLSA. When all required data is received and there are no mitigating circumstances, the NFSAM may grant NLSA. The NFSAM prepares a letter notifying the PM that NLSA has been granted. After NLSA is granted, the NLSA granting letter is forwarded to the PM and is added as quality records. And the HOWI user is to proceed to step 6.9 for HOWI closeout.

**Note:** Mitigating circumstances are determined by the NFSAM based on his professional experience required by his position description using available health-physics reference materials.

**Note:** For Shuttle launches, an NLSA granting letter is NOT prepared. The OSTP notification in the following step is used in place of a separate letter for launches in this  $A_2$  range.

- 6.4.4 NFSAM Notify OSTP of Granting NLSA:

The NFSAM notifies the Executive Office of the President's (EOP) Office of Scientific and Technical Policy (OSTP) per reference 4.3 of granting NLSA for the mission using the RMR format in NPG 8715.3 Section 5.5.2 as shown in Appendix A.3. The PM will be sent a copy of the OSTP's notification which contains the NLSA as their notification. For these launches, the PM supporting materials and the OSTP notification are added to the NLSA Files. And the HOWI user is to proceed to step 6.9 for HOWI closeout. Appendix A contains a sample OSTP Notification Letter.

- 6.5 NFSAM & PM Respond to  $10 < A_2 < 500$  Guidelines:  
NLSA uses NPG 8715.2 Section 5.4.6. (If  $A_2 > 500$  then go to step 6.6)

6.5.1 NFSAM Data Complete?

*For  $10 < A_2 < 500$ , the PM is required by NPG 8715.2 Section 5.4.6 to provide the NFSAM with the Radiological Materials Report (RMR) (NPG 8715.2 Section 5.5.2) and a request for NLSA, a mission description and additional radiological risk scoping materials (per NPG 8715.2 Section 5.4.6.1 and 5.4.6.2).*

The NFSAM will ensure that the material is complete and clear. If it is not complete per NPG 8715.2 Section 5.4.6 or it is not clear, then more data will be requested. The NFSAM may request additional data be provided for sources which are not calibration or commonly used sources (e.g.; Orbiter Smoke Detectors are considered as common sources for NLSA). Otherwise NLSA review will commence.

6.5.2 NFSAM Request Completion/Resolution from Program Manager:

The NFSAM will contact the PM and request that the required data be resubmitted.

*Note: The PM has the option to cancel the mission.*

6.5.3 NFSAM Analyze Nuclear Risk and Discuss with PM:

Per NPG 8715.2 Section 5.4.6.3, the NFSAM analyses the radiological risk and then reviews the PM request for NLSA submission. With the PM's assistance, a presentation is prepared for the AA/SMA showing the risk associated with the launching of the intended radiological materials.

6.5.4 NFSAM with PM Present Nuclear Risk to AA/SMA

The NFSAM will present the risk due to the use of radiological materials on the mission to the AA/SMA. The AA/SMA may grant or defer NLSA after reviewing the presentation. This decision is based on his professional judgement and experience.

6.5.5 AA/SMA Grant NLSA?

The AA/SMA will either grant NLSA or defer the decision pending more analysis. If NLSA is not granted, the NFSAM and the PM will repeat steps 6.5.2 through 6.5.4.

6.5.6 NFSAM Notify PM

The NFSAM prepares a letter notifying the PM that NLSA has been granted. After the AA/SMA signs the letter, the NLSA granting letter is forwarded to the PM and is added as a quality record. And the HOWI user is to proceed to step 6.9 for HOWI closeout.

6.5.7 NFSAM Notify OSTP of Granting NLSA

The NFSAM notifies the EOP Office of Scientific and Technical Policy (OSTP) of granting NLSA for the mission using the RMR format in NPG 8715.3 Section 5.5.2 as shown in Appendix A.3. The PM will receive a copy of the OSTP's notification which contains the NLSA as their notification. For these launches, the PM supporting materials and the OSTP notification are added to the NLSA Files. And the HOWI user is to proceed to step 6.9 for HOWI closeout. Appendix A contains a sample OSTP Notification Letter.

6.6 NFSAM & PM Respond to  $500 < A_2 < 1,000$  Guidelines:

NLSA uses NPG 8715.2 Section 5.4.7. (If  $A_2 > 1,000$  then go to step 6.7)

6.6.1 NFSAM Data Complete?

*For  $500 < A_2 < 1,000$ , the PM is required by NPG 8715.2 Section 5.4.7 to provide the NFSAM with the Radiological Materials Report (RMR) (NPG 8715.2 Section 5.5.2) and, a request for NLSA, a mission description, additional radiological risk scoping materials and a Safety Analysis Summary (per NPG 8715.2 Section 5.4.7).*

The NFSAM will ensure that the material is complete and clear. If it is not complete per NPG 8715.2 Section 5.4.6 or it is not clear, then more data will be requested. The NFSAM may request additional data be provided for sources which are not calibration or commonly used sources (e.g.; Orbiter Smoke Detectors are considered as common sources for NLSA). Otherwise NLSA review will commence.

6.6.2 NFSAM Request Completion/Resolution from Program Manager:

The NFSAM will contact the PM and request that the required data be resubmitted.

*Note: The PM has the option to cancel the mission.*

6.6.3 NFSAM Analyze Nuclear Risk and Discuss with PM:

Per NPG 8715.2 Section 5.4.7.3, the NFSAM analyses the radiological risk and then reviews the PM's request for NLSA submission. With the PM, a presentation is prepared for the AA/SMA and the NASA Administrator. If the NFSAM can not fully quantify the risk or is not comfortable with the level of risk due to the radiological materials, then the NFSAM may defer NLSA and request the PM provide additional data per step 6.6.2.

The NFSAM's analysis, along with the SAS and the briefing(s) to the AA/SMA and the NASA Administrator are filed as Quality Records.

6.6.4 NFSAM with PM Present Nuclear Risk to AA/SMA

The NFSAM briefs the AA/SMA on the risk due to the intended use of the radiological materials. If the NFSAM can not fully quantify the risk to the AA/SMA or the AA/SMA is not comfortable with the level of risk due to the radiological materials, then the AA/SMA may defer NLSA and request the PM provide additional data per step 6.6.2. The presentation is filed as a Quality Record.

6.6.5 NFSAM with PM Present Nuclear Risk to NASA Administrator:

The NFSAM briefs the NASA Administrator (or his designee) on the risk due to the intended use of the radiological materials. The NASA Administrator may grant NLSA. If the NFSAM can not fully quantify the risk to the NASA Administrator or the NASA Administrator is not comfortable with the level of risk due to the radiological materials, then the NASA Administrator may defer NLSA. The presentation is filed as a Quality Record.

6.6.6 AA/SMA Notify PM of Negative NLSA:

If the NASA Administrator has deferred the decision pending more analysis, the NFSAM will prepare (or assist the administrator's staff in preparing) a notification of deferment and the notification is forwarded to the PM. The NFSAM and the PM will repeat steps 6.7.2 through 6.7.5. Additionally, the NASA Administrator may cancel the launch/mission which is a process outside of this HOWI.

6.6.7 NFSAM Notify PM of Granting NLSA:

If the NASA Administrator has granted NLSA, then the NFSAM will prepare (or assist the Administrator's staff in preparing) a letter to the PM of the NLSA. The letter will be forwarded to the PM and then added as a quality record.

6.6.8 NFSAM Notify OSTP of Granting NLSA

The NFSAM notifies the EOP OSTP of granting NLSA for the mission using the RMR format in NPG 8715.3 Section 5.5.2 as shown in Appendix A.3. The PM will receive a copy of the OSTP's notification which contains the NLSA as their notification. For these launches, the PM supporting materials and the OSTP notification are added to the NLSA Files. And the HOWI user is to proceed to step 6.9 for HOWI closeout. Appendix A contains a sample OSTP Notification Letter.

6.7 NFSAM & PM Respond to  $1,000 < A_2$  Guidelines:  
NLSA uses NPG 8715.2 Section 5.4.8.

6.7.1 PM with NFSAM Prepare an Interagency Nuclear Safety Review Panel (INSRP)  
Empanelment Letter with PM:

*This step is reached because the  $A_2$  value for the mission exceeds 1,000. NLSA uses NPG 8715.2 Section 5.4.8. Per PD/NSC-25, an ad hoc INSRP for the subject mission is required to be empanelled. The PM, in coordination with the NFSAM, prepares a request to empanel an INSRP. The responsibility for the INSRP empanelment lies with the PM and not the NFSAM. Completion of this step also initiates the sub process for development of a Radiological Emergency Plan shown in a later step.*

The NFSAM assist the PM in preparing the INSRP empanelment letter(s)

6.7.2 NASA Administrator NASA Administrator empanels an *ad hoc* INSRP for Mission:

*When members of the INSRP are designated by the participating agencies, per PD/NSC-25 Paragraph 9, the ad hoc Mission INSRP is empanelled. Appendix A contains sample letters for mission INSRP empanelment. The INSRP empanelment letters are retained as quality records.*

The NFSAM assists in the coordination of the INSRP empanelment and provides OSMA interface between the PM and the INSPR members.

6.7.3 NFSAM with the INSRP Data Complete?

*The PM is required by NPG 8715.2 Section 5.4.8 to provide the NFSAM (and the INSRP for that mission) a Safety Evaluation Report (SER) for the mission and for major sources ( $A_2 > 1,000$ ). For other sources intended for use on the mission whose individual  $A_2$  values are between 500 and 1,000, the PM may provide the NFSAM & INSRP with a separate Safety Analysis Summary (per NPG 8715.2 Section 5.4.7) or may include the risk information in the SAR. For sources whose individual  $A_2$  values are less than 500, the information on the sources may be submitted on the RMR or may be included in the SAS or the SAR.*

The NFSAM will assist the INSRP, as the NASA liaison to the INSRP, in ensuring that the material is complete and clear. The NFSAM may request additional data be provided for sources which are not calibration or commonly used sources (e.g.; Orbiter Smoke Detectors are considered as common sources for NLSA).

*The SAR is prepared per NPD 8715.2 Sections 5.8.3 through 5.4.8.5 and delivered to the ad hoc Mission INSRP as well as the NASA Administrator.*

*The ad hoc Mission INSRP prepares a SER per NPD 8715.2 Section 5.4.8.6.*

When the SAR & SER are complete, the PM and the INSRP will prepare presentations on their analyses. The SAR, SER and empanelment letters are added to the NLSA files.

#### 6.7.4 NFSAM with the INSRP Request Completion/Resolution from Program Manager

If additional materials are needed by the INSRP or to comply with NPG 8715.5 Chapter 5 requirements, the NFSAM will request additional data from the PM.

*Note: The PM has the option to cancel the mission.*

#### 6.7.5 NFSAM with the INSRP and the PM Present Nuclear Risk to the AA/SMA:

The PM/INSRP/NFSAM presents the results of the SAR, SER and the Radiological Emergency Planning to the AA/SMA for review. The draft request by the NASA Administrator to ask OSTP for NLSA are included in this briefing.

This briefing is a check of the logic and accuracy of the presentation of risk to the NASA Administrator. The AA/SMA can not modify the INSRP's findings; however, may offer suggestions on how to improve the briefing to the NASA Administrator.

#### 6.7.6 NFSAM with the INSRP and the PM Present Nuclear Risk to NASA Administrator:

The PM/INSRP/NFSAM presents the results of the SAR, SER and the Radiological Emergency Planning to the AA/SMA and NASA Administrator for review.

*At the conclusion of the meeting, the PM will ask the NASA Administrator for a decision on requesting NLSA from the OSTP. The NASA Administrator decision process is out-of-scope for this HOWI.*

#### 6.7.7 PM, NFSAM & INSRP Request NLSA from OSTP?

If NLSA is not granted, the NFSAM, the INSRP and the PM will repeat steps 6.7.4 through 6.7.6 or the NASA Administrator may cancel the launch. If the NASA Administrator decides to continue pursuing NLSA from OSTP then the process continues

#### 6.7.8 PM, NFSAM & INSRP Present Nuclear Risk to the OSTP

OSTP reviews the NASA Administrator's request for NLSA and either grants or denies NLSA for the mission. The OSTP decision process is out-of-scope for this HOWI.

#### 6.7.9 NFSAM with PM Grant NLSA?

If NLSA is not granted by the OSTP, the NFSAM, the INSRP and the PM will repeat steps 6.7.4 through 6.7.8 or the OSTP may suggest/direct the NASA Administrator to cancel the launch/mission which is a process outside of this HOWI.



6.8.0 NFSAM                                      Begin Radiological Emergency Preparedness Planning (REPP):

The NFSAM will ensure that the Radiological Emergency Planning Process is begun within the program, at the Launch Site and in conjunction with other Federal, State and local government emergency response organizations. Preparations should be done per NPD 8715.1.

*The launch site is responsible for conducting training for the radiological emergency preparedness team(s) members.*

6.8.1 NFSAM                                      Prepare NASA HQ REPP

The NASA HQ REPP is prepared to define the actions required at an Agency and at a Headquarters Level to support emergency actions associated with a mission contingency. Interfaces with other Federal Agency Headquarters will also be specified in the plan.

6.8.2 NFSAM with AA/SMA                      Review and Approval of REPPs

Approval of the HQ REPP will be jointly by the AA/SMA and the Associate Administrator for the Strategic Enterprise responsible for the mission. The NFSAM reviews the REPPs for the mission with the AA/SMA to obtain his approval and signature. The review is done in conjunction with the other REPPs prepared by the launch site and the contingency plans produced by the project.

6.8.3 NFSAM                                      Establish NASA HQ Radiological Emergency Operations Center (EOC):

The EOC is established in accordance with the procedures in the NASA HQ REPP prior to the launch. The launch site will establish a Radiological Control Center (RADCC) in accordance with the procedures in the Launch Site REPP.

6.8.4 NFSAM                                      Notify OSTP in Periodic Notification:

Prior to launch, the NFSAM notifies the OSTP of granting NLSA for the mission using the RMR format. That NASA intends to launch and has not identified any changes to the radiological risk presented prior to OSTP granting NLSA. The OSTP notification is added to the NLSA Files. And the HOWI user is to proceed to step 6.9 for HOWI closeout. Appendix A contains a sample OSTP Notification Letter.

6.9 NFSAM                                        Retain NLSA File:

The NFSAM reviews the mission NLSA file and other analysis performed in preparation of the NLSA and the launch. Any vital information not already in the Quality Record files is added to the NLSA files.

6.10 NFSAM                                      Closeout

When all NLSA actions are complete, the process is closed out.

## 7. Quality Records

Record ID	Owner	Location	Media Electronic /hardcopy	Schedule Number & Item Number	Retention & Disposition
NLSA Granting Letter (All $A_2$ values)	NFSAM	NFSAM Files	Hardcopy	Schedule: 5 Item: 29	Keep 1 years after mission complete then destroy 6 years after mission complete
OSTP Notification Letter ( $0.001 < A_2$ )	NFSAM	NFSAM Files	Hardcopy	Schedule: 5 Item: 29	Keep 1 years after mission complete then destroy 6 years after mission complete
Analysis and AA/SMA briefing for launch of $10 < A_2 < 500$	NFSAM	NFSAM Files	Hardcopy	Schedule: 5 Item: 29	Keep 1 years after mission complete then destroy 6 years after mission complete
SAS, SAS Review Analyses and Briefing for launch of $500 < A_2 < 1,000$	NFSAM	NFSAM Files	Hardcopy	Schedule: 5 Item: 29	Keep 1 years after mission complete then destroy 6 years after mission complete
INSRP Empanelment letters	NFSAM	NFSAM Files	Hardcopy	Schedule: 5 Item: 29	Keep 1 years after mission complete then destroy 6 years after mission complete
File on Mission INSRP Evaluations	NFSAM	NFSAM Files	Hardcopy	Schedule: 5 Item: 29	Keep 1 years after mission complete then destroy 6 years after mission complete
NASA HQ REPP	NFSAM	NFSAM Files	Hardcopy	Schedule: 1 Item: 3	Keep 2 years after mission complete then destroy
Notification of Canceled Mission	NFSAM	NFSAM Files	Hardcopy	Schedule: 5 Item: 29	Keep 1 years after mission complete then destroy 6 years after mission complete



## **Appendix A: Samples**

1. Sample Empanelment Letter for NASA INSRP Member
2. Sample Empanelment Letter for DoD INSRP Member
3. Sample OSTP Launch Notification Letter

**Sample Empanelment Letter for NASA INSRP Member**

National Aeronautics and  
Space Administration  
**Office of the Administrator**  
Washington, DC 20546-0001



JUN 7 1999

Mr. John W. Lyver, IV  
Manager, Nuclear Flight Safety Assurance  
Office of Safety and Mission Assurance  
National Aeronautics and Space Administration  
Washington, DC 20546-0001

Dear Mr. Lyver:

Effective immediately, you are hereby appointed as the NASA member of the *ad hoc* Interagency Nuclear Safety Review Panel for the Mars Surveyor 2001 Lander Mission. Your role as NASA's INSRP member for this mission is to ensure that the INSRP carries out the pertinent provisions of Paragraph 9 of Presidential Directive/NSC-25 (PD/NSC-25), as amended. I am confident that you will continue the tradition of NASA leadership in the safe use of nuclear materials in the exploration of space.

Congratulations on this appointment.

Sincerely,

A handwritten signature in cursive script, reading "Daniel S. Goldin".

Daniel S. Goldin  
Administrator

cc:  
G/Mr. Frankle  
Mr. Stephens  
Q/Mr. Gregory  
Dr. Greenfield  
S/Dr. Weiler  
Dr. Huckins

## Sample Empanelment Letter for DoD INSRP Member

National Aeronautics and  
Space Administration  
**Office of the Administrator**  
Washington, DC 20546-0001



The Honorable Jacques S. Gansler  
Under Secretary of Defense  
for Acquisition and Technology  
Washington, DC 20301-3010

Dear Dr. Gansler:

In accordance with the interagency cooperation reflected in paragraph 9 of Presidential Directive/National Security Council Memorandum #25 (PD/NSC-25), as amended, an ad hoc Interagency Nuclear Safety Review Panel (INSRP) is needed for the NASA Mars Surveyor 2001 Lander mission. This is to request the name of your designee who will serve as your Agency's INSRP member for this mission.

The Mars Surveyor 2001 Lander, was approved for development beginning in fiscal year 1999. The baseline mission plan calls for the spacecraft to be launched during the April 2001 opportunity on a Delta II 7425 launch vehicle from the Eastern Test Range at the Cape Canaveral Air Station, Florida. A solid propellant STAR-48B Payload Assist Module upper stage then would place the spacecraft on a trajectory to Mars.

The Mars Surveyor 2001 Lander will consist of a solar powered lander carrying several scientific instruments and a small, robotic roving vehicle. The baseline rover design includes three Light Weight Radioisotope Heater Units (LWRHU) for thermal control. Each LWRHU contains approximately 2.7 grams of plutonium dioxide with  $1.2 \times 10^{12}$  Bq (33 curies) of radioactivity. Other small sources for scientific instruments include cobalt-57 with  $1.3 \times 10^{10}$  Bq (350 millicuries); curium-242 with  $3.0 \times 10^4$  Bq (0.9 microcuries); and curium-244 with  $1.9 \times 10^3$  Bq (50 millicuries).

The INSRP process is expected to be similar to the process used on previous missions with onboard nuclear sources. The INSRP will review the mission's nuclear launch safety analysis and document its evaluation in a safety evaluation report as provided in PD/NSC-25.

2

The NASA point of contact for this mission is Mr. Mark R. Dahl, Office of Space Science, (202) 358-0306. The NASA INSRP member for this mission is Mr. John W. Lyver IV, Office of Safety and Mission Assurance, (202) 358-1155.

NASA looks forward to continuing our excellent working relationship on this important planetary exploration mission.

Sincerely,

/s/

Daniel S. Goldin  
Administrator

cc:

DOE/Mr. Richardson  
EPA/Ms. Browner  
NRC/Dr. Jackson

bc:

G/Ms. S. Najjar-Wilson  
Q/Mr. F. Gregory  
Q/Dr. M. Greenfield  
QS/Mr. J. Lyver  
S/Dr. E. Weiler  
S/Dr. E. Huckins  
SD/Mr. K. Ledbetter  
SD/Mr. M. Dahl  
JPL/Mr. R. Wilcox  
DOE/NE-50/Mr. E. Wahlquist  
DOD/Mr. F. Celec

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**Sample OSTP Notification Letter**

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QS

May 25, 1999

Mr. Jefferson S. Hofgard  
Assistant Director for Space and Aeronautics  
Office of Science and Technology Policy  
Old Executive Office Building – Room 423  
17th and Pennsylvania Avenue, NW  
Washington, DC 20502

Dear Mr. Hofgard:

This is an update to the routine notification of NASA's planned launching of radioactive materials into space for a 3-month period beginning with STS-96 in May 1999. The enclosure lists the sources planned for use on NASA spacecraft and replaces all previous lists. The proposed minor radioactive sources for subject launches have been reviewed by the NASA Interagency Nuclear Safety Review Panel Coordinator per Table 1 of the International Atomic Energy Agency, Safety Series 6, Regulations for the Safe Transport of Radioactive Materials, 1985 edition with 1990 amendment, as directed in PD/NSC-25. The total radioactive material contained on each launch does not provide a measurable increase in risk to the general public. These sources are determined to be safe to launch.

If you have any questions concerning this information or desire any background concerning the use of the sources, please call me on 202/358-1155.

Sincerely,

John W. Lyver, IV, C.S.P.  
NASA Interagency Nuclear Safety  
Review Panel Coordinator

Enclosure

cc:  
Small Source Distribution

## QUARTERLY REPORT MINOR RADIOACTIVE SOURCES

May 1999 – July 1999

Vehicle/ Spacecraft	Planned launch Date	Launch Site	Number of Sources	Isotope	Total Activity (Ci)	A <sub>2</sub> Limit for Isotope	A <sub>2</sub> Multiplier for Isotope	Remarks
STS-96 Spacehab-DM ISS- 2A.1	May 99	KSC	18	Am-241	6.12x10 <sup>-6</sup>	0.005	0.0012	Orbiter fire detectors
			4	Am-241	2.00x10 <sup>-6</sup>	0.005	0.0004	Spacehab fire detectors
			1	Cm-244	1.0x10 <sup>-6</sup>	0.01	0.0001	TEPC
								S = 0.002

Distribution:

AE/Dr. Daniel Mulville  
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JE/Mr. Kenneth Kumor  
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QS/Mr. James Lloyd  
S/Dr. Edward Weiler  
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U/Dr. Arnauld Nicogossian  
ARC/TO34/Radiation Safety Officer  
DRFC/OFV/Radiation Safety Officer  
GRC/0100/Mr. Donald J. Campbell  
    0530/Mr. Bill Schoren  
    60-3/Ms. Gayle Reid  
GSFC/205.2/Mr. Phillip Nessler  
JPL/301-472/Mr. J. Mark Phillips  
JSC/NA/Mr. John Casper  
    MA2/Mr. A.M. Larsen  
    MA2/Mr. D. O'Brien  
    SD2/Dr. Tracy Chui-hsu Yang  
    SD23/Mr. A. Orsak  
    SN3/Mr. Michael J. Gollightly  
KSC/BOC-22/Ms. Teri Rutherford  
    BR-C/Mr. William R. Fletcher  
    EI-F/Mr. John Dollberg  
    IM-SPS-A/Mr. Wayne M. Kee  
    JJ-C/Mr. George M. Marmaro  
    STS Resident Office, Lompoc, CA  
LaRC/421/Humberto T. Garrido  
MSFC/CR10/Mr. Ed Kiessling  
SSC/QA00/Mr. John L. Gasery, Jr.  
DOD/Assistant to the Secretary of Defense (Nuclear Chemical Biological Programs)  
    USAF/Kirtland AFB/HQ AFSC/SEWA/LtCol. C. Zeringu, USAF  
        Patrick AFB/45SW/SE/Col. John P. Lucas, USAF  
            SESL/C. Botts  
                45AMDS/SGPS/Lt.Col. Randall Scott, USAF  
                Peterson AFB/HQ AFSPC/SEC/Lt.Col. Joseph Fury, USAF  
                Vandenberg AFB/30SW/SE/Col. Leon Partee, USAF  
    USN/White Sands Missile Range/USN Ordinance Test Fac/Commander  
DOE/EH-32/Mr. David Pyatt, P.E.  
    NE-50/Mr. Earle Waltquist  
DOS/Office of Internal Scientific and Technical Affairs  
DOT/FAA/AST200/Mr. Chester Nolf  
NRC/Research/Mr. Charles Bartlett